

# PATENT ABSTRACTS OF JAPAN

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## (54) DAMPER INTEGRATED STARTING DEVICE

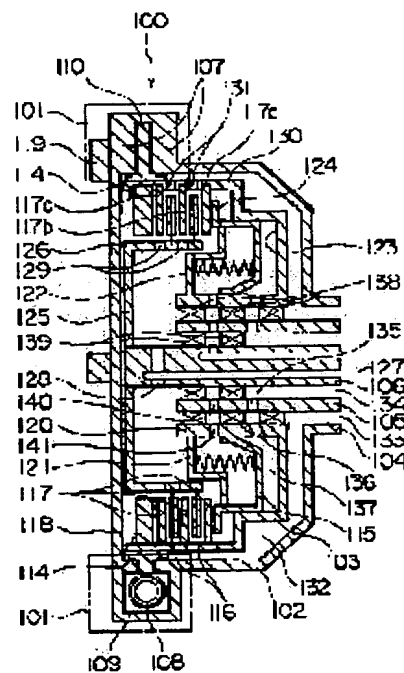
### (57)Abstract:

**PROBLEM TO BE SOLVED:** To use a viscous fluid, different from a fluid for a clutch, for a damper device so as to be able to select fluid viscosity according to a required characteristic by sealing an integrated damper device part arranged in the radial direction of a start clutch.

**SOLUTION:** Cooling oil flowing in from an axial hole 127 of an input shaft 106 flows to the peripheral side through a through hole 128, passes through a through hole 129 of a hub 125 to cool the friction faces of friction plates 116, 117 and is drained to a clearance 133 of a housing sleeve 104. At this time, a viscous fluid is sealed in a damper device 101 by a circumferentially slidable O-ring 114 arranged at a hub plate 110 of the damper device 101.

On the other hand, operating oil flowing in from the peripheral side clearance 134 of the input shaft 106 passes through a hole 136 of a cylindrical part 120 on the inner peripheral side of a clutch case through a through

hole 135, flows into an oil pressure chamber 137 and moves a clutch piston 115 to transmit power. The operation of a start clutch and the damper device, and cooling of the friction faces are therefore controlled independently.



## LEGAL STATUS

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**CLAIMS**

**[Claim(s)]**

[Claim 1] The input shaft for transmitting power to the body of a change gear, while having a hole in shaft orientations, The shank material arranged on the radial outside of this input shaft, and the clutch case which has been arranged on the radial outside of this shank material, and held the clutch section and the clutch piston which can slide on shaft orientations freely, respectively, It has housing which held this clutch case. The start clutch for change gears in which the torque transmission of arbitration is possible, In the start equipment which consists of the damper gear which carries out torque transmission between a torque input member and a torque output member, and decreases vibration of an engine, transitional torsional vibration, etc. Said damper gear formed in one in said housing of said start clutch is damper one apparatus start equipment characterized by having said clutch section and the isolated oil sac.

[Claim 2] In the damper one apparatus start equipment of claim 1 said damper gear Said slider and said spring of the each plurality arranged mostly by turns at division into equal parts are held. the inside of the heights prepared in said housing -- method \*\* of a periphery -- The oil sac isolated from said clutch section by the closure member by which said clutch case and the annular hub plate were connected, and said damper gear was formed between said hub plates and projections of housing is formed. Damper one apparatus start equipment which achieves damper ability according to concomitant use of fluid friction of the fluid and slider by which it is placed between the oil sacs of said isolated damper gear with a spring.

[Claim 3] It is damper one apparatus start equipment characterized by said closure member being O ring in the damper one apparatus start equipment of claim 2.

[Claim 4] It is damper one apparatus start equipment characterized by said closure member being a seal ring in the damper one apparatus start equipment of claim 2.

[Claim 5] It is damper one apparatus start equipment characterized by said closure member being a dust seal in the damper one apparatus start equipment of claim 2.

[Claim 6] It is damper one apparatus start equipment characterized by said closure member being a lip seal in the damper one apparatus start equipment of claim 2.

[Claim 7] It is damper one apparatus start equipment characterized by said closure member being a plain bearing in the damper one apparatus start equipment of claim 2.

[Claim 8] It is damper one apparatus start equipment characterized by said closure member being bearing in the damper one apparatus start equipment of claim 2.

[Claim 9] It is damper one apparatus start equipment which the plate by the side of said housing extends in the method of the inside of radial from the inside of said projection in the damper one apparatus start equipment of claims 1-8, and is characterized by said hub side plate extending in the method of the outside of radial from said hub plate.

[Claim 10] It is damper one apparatus start equipment characterized by for said housing side plate extending in a circumferencial direction from the inside of said projection, and said hub side plate extending in a circumferencial direction from said hub plate in the damper one apparatus start equipment of claims 1-8.

[Claim 11] It is damper one apparatus start equipment characterized by forming said damper gear in

the radial outside in the damper one apparatus start equipment of claims 1-10.

[Claim 12] It is damper one apparatus start equipment characterized by forming said damper gear in the radial inside in the damper one apparatus start equipment of claims 1-10.

[Claim 13] It is damper one apparatus start equipment characterized by forming said damper gear in both a radial outside and the radial inside in the damper one apparatus start equipment of claims 1-10.

[Claim 14] Damper one apparatus start equipment characterized by forming the power transfer path in order of an engine, said damper gear, said start clutch, and said body of a change gear in the damper one apparatus start equipment of any 1 term of claims 1-13.

[Claim 15] Damper one apparatus start equipment characterized by forming the power transfer path in order of an engine, said start clutch, said damper gear, and said body of a change gear in the damper one apparatus start equipment of any 1 term of claims 1-13.

[Claim 16] Damper one apparatus start equipment characterized by forming the power transfer path in order of an engine, said damper gear, said start clutch, said damper gear, and said body of a change gear in the damper one apparatus start equipment of any 1 term of claims 1-13.

[Claim 17] For the oil coolant way of the oil coolant which cools the friction surface of said clutch section of said start clutch in the damper one apparatus start equipment of claims 1-16, and the hydraulic oil way of the hydraulic oil given to said clutch piston of said clutch, the viscous fluid which is a different path and is used for a damper gear is damper one apparatus start equipment with which any of said oil coolant and said hydraulic oil differ, respectively.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the damper one apparatus start equipment used for cars. It is related more with the damper one apparatus start equipment which prepared the seal in the detail at the damper gear.

[0002]

[Description of the Prior Art] The damper gear which was united with the conventional engine and the wet start clutch located between the bodies of an automatic transmission has that for which the damper gear does not use viscosity, and the used thing.

[0003] Even if the damper gear without a viscous device has some which have arranged the spring between the torque input member of a damper gear, and a torque output member and viscous fluid exists around the damper section with a natural thing, it cannot be overemphasized that the damper ability or property are not influenced.

[0004] Although the oil coolant way which cools the clutch section, and the hydraulic oil way which operates a clutch piston are carrying out mutually-independent [ of the damper gear with a viscous device which was incorporated in housing of a wet start clutch and was united ], an oil coolant way is an oilway which is open for free passage with a damper gear, and is opened wide mutually.

Furthermore, the fluids which exist around the damper section and the damper section are a fluid for clutch section cooling, and common use. Therefore, the viscous device of a damper gear is decreased using the viscosity of the completely same fluid as the fluid for clutch cooling.

[0005] That is, if the damper gear which was incorporated in housing of the wet start clutch located between an engine and the body of an automatic transmission, and was united does not use the viscosity of a fluid, whatever the fluid which exists around the damper section and the damper section, it does not influence a function, a property, etc. of a damper directly. However, in order that the damper gear which was incorporated in housing of the wet start clutch located between an engine and the body of an automatic transmission, and was united may use the fluid for clutch cooling of a wet start clutch for the viscous device of a damper gear as it is, when viscosity change uses the fluid used for a remarkable wet start clutch, it is difficult to operate the designed damper property, directly in response to the fact that the effect of viscosity change.

[0006]

[The technical problem for solving invention] As explained above, the damper one apparatus start equipment with which the damper gear with a viscous device which is arranged just behind the flywheel of an engine or an engine, is incorporated in housing of the start clutch in which torque transmission is free, is united, and transmits torque, and decreases vibration of an engine, transitional torsional vibration, etc. became independent of the oilway of the start clutch section does not exist.

[0007]

[Means for Solving the Problem] In order to attain the above purpose, the damper for the start clutches of this invention is [0008]. It is characterized by forming independently a damper gear with a viscous device, respectively, connecting with a start clutch directly, considering as one, and carrying out torque transmission to the hydraulic oil way which operates the clutch piston for being

intermittent in the start clutch for change gears, and the oil coolant way which cools the friction surface of a friction plate and the drain oilway which is a part of oil coolant way, and decreasing vibration of an engine, transitional torsional vibration, etc.

[0009] Furthermore, the input shaft for transmitting power to the body of a change gear, while the damper one apparatus start equipment of this invention has a hole in shaft orientations, The clutch case which has been arranged on the radial outside of this input shaft, and held the clutch section and the clutch piston which can slide on shaft orientations freely, respectively, In the damper one apparatus start equipment which is equipped with housing which held this clutch case, and transmits torque between the start clutch for change gears in which the torque transmission of arbitration is possible, and a torque input member and a torque output member Said damper gear is formed in one in said housing of said start clutch. It is characterized by the drain oilway which are a part of hydraulic oil way where vibration of an engine, transitional torsional vibration, etc. are decreased, and said damper section operates said clutch piston, oil coolant way of said start clutch section, and oil coolant way having been independent respectively.

[0010]

[The gestalt of invention implementation] By sealing the damper gear section which has been arranged radial [ of a start clutch ] and was united, it became possible to use a different viscous fluid from said clutch section for the viscous device of a damper gear, and this invention formed the damper which can choose the viscosity of a fluid according to the need property of a damper gear.

[0011] Thereby, different viscous fluid from the lubricating oil of the body of an automatic transmission and a start clutch was used for the damper gear with a viscous device arranged the start clutch radial united with a start clutch, it used it together with the spring arranged the start clutch radial, and the damper one apparatus start equipment which decreases an engine vibration, transitional torsional vibration, etc. more effectively was formed.

[0012]

[Example] Drawing 1 is the front view which the damper one apparatus start equipment 100 of the 1st example of this invention fractured the part, drawing 2 is the axial sectional view of drawing 1, and drawing 3 is the enlarged drawing of the damper gear section 100 which used the O ring of drawing 2.

[0013] As shown in drawing 2, damper one apparatus start equipment 100 is equipped with the housing 102 which surrounds the whole equipment mostly. In housing 102, it is equipped with a damper gear 101 and the clutch case 103 is connected with the damper gear 101 through the spline etc. Some housing 102 serves as a sleeve 104, the fixed shaft 105 is arranged inside the sleeve 104, and the input shaft 106 is arranged inside the fixed shaft 105.

[0014] As for the damper gear 101 surrounded and shown in drawing 2 by the dotted line, heights 107 are formed in housing 102, and the clutch case 103 and the hub plate 110 are connected by the spline of the radial outside of the clutch case 103 etc. through the spring 108 and slider 109 which have been arranged free [ circumferencial direction sliding ]. It cannot be overemphasized that the number of a slider 109 and a spring 108 can be set as arbitration. Also in the example mentioned later, it is completely the same.

[0015] As shown in drawing 3, O ring 114 is arranged in the periphery slot 140 established in the both ends of the shaft orientations of a flange 111 possible [ sliding of a circumferencial direction ] between the cylinder inner skin 113 of the flange 111 of the hub plate 110, and the height 112 of housing 102. Moreover, in the 1st example, although a radial cross section is almost circular, if O ring 114 uses for the seal of a fluid, the cross-section configuration will not be limited.

[0016] The clutch piston 115 is arranged free [ shaft-orientations sliding ] at the clutch case 103. Inside [ radial ] the clutch case 103, two or more plates 117 and friction plates 116 in which shaft-orientations sliding is free are prepared through the spline etc. The fixed plate 118 is being fixed to the clutch case 103 by the outside of a plate 117. Three projections 119 are formed in the tooth back of the shaft orientations of the heights 107 of housing 102. Projection 119 engages with the drive plate which is not illustrated [ of a non-illustrated engine ]. It cannot be overemphasized that the number of the projection 119 of the tooth back of the shaft orientations of the heights 107 of

housing 102 can carry out an arbitration setup. Also in the example mentioned later, it is completely the same.

[0017] The circumferential circle cylinder part 120 of the clutch case 103 is connected with the fixed shaft 105 through bearing 138. The flange 121 of the shape of a circular ring which extends on the radial outside is formed in the circumferential circle cylinder part 120, and the spring 122 is arranged between the flange 121 and the clutch piston 115. The spring 122 has given the force of the direction which forces the clutch piston 115 on the inner skin 123 of the clutch case 103. The edge 124 of the method of the outside of shaft orientations of the clutch piston 115 is in contact with outermost plate 117a, and puts other Plates 117b and 117c and friction plates 116 between plate 117a and the fixed plate 118 at the time of start clutch conclusion.

[0018] The edge of an input shaft 106 is the disc-like hub 125, and the body 126 is formed in the radial outside. Two or more friction plates 116 are formed in the body 126 of a hub 125 free [ sliding ] through the spline etc. at shaft orientations. this example -- setting -- a plate 117 -- it is constituted so that one friction plate 116 may be put between each. That is, two friction plates 116 are formed. However, it cannot be overemphasized that the number of sheets of a plate 117 and the friction plate 116 can be set as arbitration. Moreover, it is also possible the friction material stuck on the friction plate 116 and to prepare in any of both sides and one side. Also in the example mentioned later, it is completely the same.

[0019] Here, the flow of the friction surface oil coolant of damper one apparatus start equipment 100 is explained using drawing 2.

[0020] The oil coolant which entered from the hole 127 established in the shaft orientations of an input shaft 106 flows to the periphery side through the radial through tube 129 of an input shaft 106. It goes via the radial through tube 129 of the body 126 of the radial outside of the hub 125 established in the edge. Pass through the penetration slot established in the friction surface and friction surface of the friction plate 116 and a plate 117, and a friction surface is cooled. The oil after friction surface cooling is discharged at the cylinder outside side of the clutch case 103 from the through tube 131 prepared in the body 130 of the radial outside of the clutch case 103. The drain of the discharged oil is carried out to the clearance 133 which consists of the periphery side of a fixed shaft the inner circumference side of the sleeve 104 of housing via the clearance 132 which consists of the outside of the body 130 of the clutch case 103, and the inner skin of housing 102. Since the damper gear 101 is sealed with O ring 114 which can slide on the circumferencial direction arranged between the cylinder inner skin 113 of the flange 111 of the hub plate 110 of a damper gear 101, and the height 112 of housing 102, the oil coolant discharged by the outside of the clutch case 103 does not flow in a damper gear 101. Next, the flow of the start clutch hydraulic oil of damper one apparatus start equipment 100 is explained.

[0021] First, the hydraulic oil containing from the clearance 134 which consists of an inner circumference side of the fixed shaft 105 the periphery side of an input shaft 106 goes to the oil pressure room 137 through the through tube 135 of the radial outside of the fixed shaft 105 via the hole 136 prepared in the inner circumference side body 120 of the clutch case 103. When concluding a start clutch, the oil pressure of this oil pressure room 137 is raised, and the clutch piston 115 is moved leftward by drawing 1 according to the oil pressure force. Consequently, the friction plate 116 and the plate 117 of each other are concluded between the clutch piston 115 and the fixed plate 118, a start clutch will be in a conclusion condition, and power transfer will be attained. If the oil pressure of the oil pressure room 137 is decreased, it moves rightward by drawing 1 according to the reaction force of a spring 122, the friction plate 116 and a plate 117 separate mutually, a start clutch conclusion condition is dispelled, and the clutch piston 115 will be in the condition of not concluding. Thus, by carrying out arbitration adjustment of the pressure of the oil pressure room 137, it becomes controllable free from about 0% to 100% about the power transmissibility of a start clutch.

[0022] Since the friction surface oil coolant way, the start clutch hydraulic oil way, and the oil sac of the damper gear section are carrying out mutually-independent with the damper one apparatus start equipment 100 explained above, actuation of a start clutch, cooling of a friction surface, and

actuation of a damper gear are independently controllable free respectively. Furthermore, there is no effect in a start clutch and the control of a damper gear themselves as for one about a start clutch and a damper gear.

[0023] Here, the power transfer path of damper one apparatus start equipment 100 is explained using drawing 2.

[0024] It is first transmitted to the housing 102 which is united with the projection 119 prepared in the tooth back of housing 102 through the non-illustrated drive plate from the non-illustrated engine at the time of start clutch conclusion. Next, power is transmitted to the clutch case 103 connected through the spring 108 and the slider 109 110, i.e., a damper gear, by the spline by the side of the periphery of the body 130 of the clutch case 103 etc. from the heights 107 of housing 102.

Furthermore, it is transmitted to an input shaft 106 through the friction plate 116 and hub 129 against which the plate 117 connected with the inner circumference side of the body 130 of the clutch case 103 through the spline etc. was pushed by the clutch piston 115.

[0025] Next, at the time of release of a start clutch, the power outputted from the non-illustrated engine is transmitted to the housing 102 which is united with the projection 119 prepared in the tooth back of housing 102 through the non-illustrated drive plate. Next, power is transmitted to the clutch case 103 connected with the periphery side of the body 130 of the clutch case 103 by the spline etc. through the spring 108 and the slider 109 from the heights 107 of housing 102. Furthermore, it is transmitted to the plate 117 connected with the inner circumference side of the body 130 of the clutch case 103 through the spline etc. However, since connection between a plate 117 and the friction plate 116 is severed, at the time of release of a start clutch, there is no power transfer on the friction plate 116 from a plate 117, and a start clutch is neutral at it.

[0026] Drawing 4 is the fragmentary sectional view showing the detail drawing of the damper gear which used the seal ring 201 of the 2nd example of this invention. In the 2nd example, the cross-section configuration of a seal ring 201 is a rectangle mostly.

[0027] Drawing 5 is the fragmentary sectional view showing the detail drawing of the damper gear which used the dust seal 301 of the 3rd example of this invention. In the 3rd example, there is no slot in the flange 311 of the hub plate 110, and the character type dust seal 301 of cross-section KO is infixed between the cylindrical shape inner skin 113, the hub plate 110, and the inner skin of a flange 311.

[0028] Drawing 6 is the fragmentary sectional view showing the detail drawing of the damper gear which used the oil seal 401 of the 4th example of this invention. In this example, it is infixed between the projection 412 of housing 112, and the flange 411 of the hub plate 110. The character type oil seal 401 of cross-section KO touches the 2nd projection 413 which extends in a way while preparing in the inside and height 412 of housing 102 further. Therefore, the seal of the three interface damper gears can be carried out in all.

[0029] Drawing 7 is the fragmentary sectional view showing the detail drawing of the damper gear which used the plain bearing 501 of the 5th example of this invention. The plain bearing 501 of a cross-section \*\*\*\* rectangle is fitted in between the flange 511 of the hub plate 110, and the height 512.

[0030] Drawing 8 is the fragmentary sectional view showing the detail drawing of the damper gear which used the bearing 601 of the 6th example of this invention. [0031] by which the bearing 601 of a cross-section \*\*\*\* rectangle is fitted in between the flange 611 of the hub plate 110, and the height 612 Drawing 9 is the fragmentary sectional view showing the detail drawing of the damper gear which used V packing (lip seal) 701 of the 7th example of this invention. V packing 701 of a cross-section the mold of V characters is fitted in between the flange 711 of the hub plate 110, and the height 712.

[0032] Since the basic structure in the 2nd example - the 7th example, a power transfer path, the flow of an oil, and the basic property of a damper one apparatus start clutch are the same as said 1st example, explanation here is omitted.

[0033] Moreover, if a seal is possible as a result when it attaches [ \*\*\*\* ] for the purpose of a seal in addition to what was mentioned above, it cannot be overemphasized that it is materialized without



completely being restricted to the configuration and quality of the material.

[0034] Moreover, damper one apparatus start equipment can be applied to unapproved change gears, such as the power transmission device of not only the conventional automatic transmission (A/T) but others, for example, CTV etc., etc. completely similarly.

[0035] According to the 1st example explained above, the viscous fluid used for a damper gear with the viscous device of damper one apparatus start equipment By using a fluid with little viscosity change, since the fluid of suitable viscosity can be set up freely It becomes possible to decrease vibration of an engine and transitional torsional vibration effectively, and for the damper one apparatus start equipment used as some transmissions to raise the degree of comfort of a vehicle, and to raise the operation operability of a vehicle. Furthermore, it cannot be overemphasized that the endurance and the life of the start clutch itself improve. Moreover, the damping property stabilized by using the viscous fluid only for damper gears without using ATF of the remarkable automatic transmission of degradation with the passage of time is maintainable.

[0036] Even if it made the oil sac where the seal of the damper gear section was carried out become independent of the drain oilway and clutch control oilway which are a part of oilway only for cooling aiming at friction surface cooling, and oilway only for cooling, damper one apparatus start equipment was formed without completely influencing the damping function of a damper gear, and the property of a start clutch.

[0037]

[Effect of the Invention]

(1) By sealing a damper gear by the seal, bearing, etc., being able to select the fluid of suitable viscosity, and setting up freely the damping property of a damper gear with a viscous device, for example, using a fluid with little viscosity change by temperature, decrease vibration of an engine and transitional torsional vibration more effectively, and the endurance and the life of a start clutch improve.

[0038] (2) The stable damping property can be maintained by using the fluid of its dedication without using ATF with the conventional remarkable degradation with the passage of time which is bearing the lubrication of cooling of a friction surface, or other automatic transmissions for a damper gear with a viscous device.

[0039] (3) Even if it made the oil sac where the seal of the damper gear was carried out become independent of the drain oilway and clutch control oilway which are a part of oilway only for cooling aiming at friction surface cooling, and oilway only for cooling, damper one apparatus start equipment was formed without completely influencing the damping function of a damper gear, and the property of a start clutch.

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the front view which the damper one apparatus start equipment 100 of the 1st example of this invention fractured the part.

[Drawing 2] It is the axial sectional view of the damper one apparatus start equipment 100 of the 1st example of this invention.

[Drawing 3] It is the enlarged drawing of the damper gear section using the O ring of the damper one apparatus start equipment 100 of the 1st example of this invention.

[Drawing 4] It is the partial cross section which shows the detail drawing of the damper gear using the seal ring 201 of the 2nd example of this invention.

[Drawing 5] It is the fragmentary sectional view showing the detail of the damper gear using the dust seal 301 of the 3rd example of this invention.

[Drawing 6] It is the fragmentary sectional view showing the detail of the damper gear using the oil seal 401 of the 4th example of this invention.

[Drawing 7] It is the fragmentary sectional view showing the detail of the damper gear using the plain bearing 501 of the 5th example of this invention.

[Drawing 8] It is the fragmentary sectional view showing the detail of the damper gear using the bearing 601 of the 6th example of this invention.

[Drawing 9] It is the fragmentary sectional view showing the detail of the damper gear using V packing 701 of the 7th example of this invention.

[Translation done.]